WHAT IS CLAIMED IS:

1. A ceramic heater system comprising:

a ceramic heater base having a substrate mounting surface formed on a top surface thereof;

a heater, buried in said heater base, for heating a substrate; and

a fluid passage provided in said heater base below said heater,

whereby said heater base is cooled by letting a fluid whose temperature is lower than a temperature of said heater base flow in said fluid passage.

2. The ceramic heater system according to claim 1, wherein said fluid passage has a plurality of concentric circular passage portions and a plurality of penetration passage portions connecting the circular portions passage, and any adjacent two of the penetration passage portions are not aligned in a radial direction.

3. The ceramic heater system according to claim 2, wherein the penetration passage portions connecting any two adjacent circular portions are arranged at regular intervals along either circular portion, and each penetration passage portions made in one of walls defining a circular portion opens to that part of the other wall of the circular portion, which is located between two adjacent penetration passage portions made in the other wall of the circular

portion.

4. The ceramic heater system according to claim 2, wherein said fluid passage has a fluid inlet in a lower portion of said heater base and fluid outlets at end portions of said heater base.

5. The ceramic heater system according to claim 3, wherein said fluid which flows in said fluid passage is at least one gas selected from Ar, He, Ne and N_2 gases or a mixed gas thereof.

6. The ceramic heater system according to claim 5, wherein said fluid is a mixed gas of Ar and He.

7. The ceramic heater system according to claim 1, wherein a ratio of H_2 flow rate to Ar flow rate is 20% or more.

8. The ceramic heater system according to claim 1, wherein a temperature of said fluid which flows in said fluid passage ranges is adjusted to be lower than a then temperature of said heater base by 100 to 200℃.

9. The ceramic heater system according to claim 1, wherein said heater has a high-melting-point metal patterned in such a coil form as to evenly generate heat in said heater base and two zones.

10. The ceramic heater system according to claim 1, wherein said heater is formed of graphite or glassy carbon shaped in such a pattern as to evenly

generate heat in said heater base.

11. The ceramic heater system according to claim 9, wherein said heater has glassy boron nitride coated on an outer surface of graphite or glassy carbon of which said heater is formed.

12. The ceramic heater system according to claim 1, further comprising:

an electrode buried in said heater base above said heater; and

a DC power supply for applying a DC voltage to said electrode,

whereby applying said DC voltage to said electrode causes said substrate mounted on said mounting surface to be electrostatically chucked.

13. The ceramic heater system according to claim 1, further comprising:

a fluid source for supplying a fluid to said fluid passage;

a temperature adjuster for adjusting a temperature of said fluid supplied from said fluid source within a range of -10 to 800℃ and causing said fluid to flow into said fluid passage; and

a heat exchanger for removing coarse heat of said fluid raised by said heater base,

whereby said fluid is circulated in a cycle of said fluid source to said temperature adjuster to said fluid passage to said heat exchanger while said

temperature of said fluid is being adjusted.

14. The ceramic heater system according to claim 1, further comprising heat-discharging fins on a heater-side surface of said fluid passage.

15. The ceramic heater system according to claim 1, further comprising heat-discharging fins on both side surfaces of said fluid passage with respect to a heater side and at positions closer to said heater.

16. The ceramic heater system according to claim 1, wherein heater-side inner surface which is said fluid passage has a roughened irregularity surface.

17. The ceramic heater system according to claim 2, wherein said fluid passage has a fluid inlet formed in a lower portion of said heater base and a plurality of fluid outlets formed through circumferential side walls of said heater base.

18. A ceramic heater system comprising:

an upper heater base of ceramics having a substrate mounting surface formed on a top surface thereof and a groove formed at a bottom surface to serve as a fluid passage;

a lower heater base of ceramics closely adhered to a bottom side of said upper heater base, thereby making said groove airtight; and

a heater, buried in said upper heater base, for

heating a substrate,

whereby said heater base is cooled by causing a fluid having a temperature lower than temperatures of said upper and lower heater bases to flow in said fluid passage.

19. A substrate processing apparatus comprising:

a chamber whose interior can be kept in a vacuum state by an exhaust system;

a ceramic heater system, placed in said chamber, for heating a substrate mounted thereon; and

processing means for performing a predetermined treatment on said substrate in said chamber,

said ceramic heater system including,

a ceramic heater base having a substrate-mounting surface formed on a top surface thereof,

a heater, buried in said heater base, for heating said substrate, and

a fluid passage provided in said heater base below said heater, whereby said heater base is cooled by letting a fluid whose temperature is lower than a temperature of said heater base flow in said fluid passage.

20. The substrate processing apparatus according to claim 19, wherein said processing means includes:

a process-gas supply mechanism for feeding a process gas; and

a shower head, provided in said chamber at

a ceiling thereof, for introducing said process gas from said process-gas supply mechanism,

whereby a film is formed on said substrate by a reaction of said process gas.

21. The substrate processing apparatus according to claim 20, further comprising:

a high-frequency power supply, connected to said shower head, for electrically isolating said shower head and applying high-frequency power to said shower head,

whereby applying said high-frequency power produces plasma in said chamber with said process gas supplied inside from said shower head and said film is formed on said substrate by a reaction of said process gas with said plasma.

22. The substrate processing apparatus according to claim 19, wherein said processing means includes:

an etching-gas feeding mechanism for feeding an etching gas; and

an electrically isolated shower head, provided in said chamber at a ceiling thereof, for introducing said etching gas from said etching-gas supply mechanism;

a high-frequency power supply, connected to said shower head, for applying high-frequency power to said shower head,

whereby applying said high-frequency power produces plasma in said chamber with said etching gas

supplied inside from said shower head and said film is formed on said substrate by a reaction of said etching gas with said plasma.